**Name: Aung Zaw Oo Date:14/08/12**

**Task 1 - Energy auditing a computer system & recommend how sustainability can be integrated into an upgrade**



Instruction

• Gather information to prepare the installation of an energy measuring device on a computer system

• Prepare for the installation of the device

• Configure and test the device

• Complete and document installation and test results

• Evaluate opportunities to integrate sustainable ICT projects and reduce energy consumption

**Project Resources**

Current Cost EnviR Energy Monitor

Warning: Installation is simple yet if you are in Australia, for liability reasons it is required to be carried out by a qualified electrician when in in a power switchboard.

* <http://www.smartnow.com.au/installinstructions.php>
* <http://www.smartnow.com.au/current_cost_bridge.php>

**Theory**

Complete the following notes:

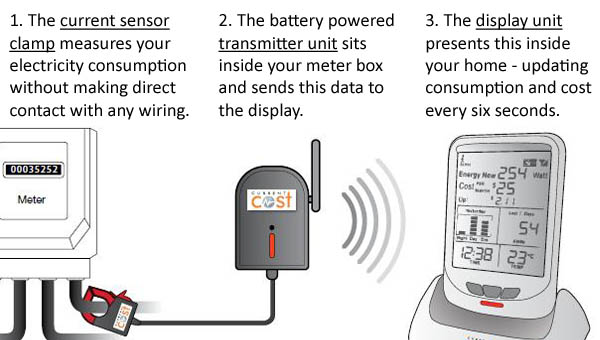
1. Q: Does the Current Cost EnviR Energy Monitor comply with Electrical Safety Standards?

ANSWER: Yes, it’s complying with Electrical Safety Standards.

1. Advise how you prepared the installation of Current Cost EnviR Energy Monitor

ANSWER:

1. Connect the current sensor clamp and transmitter unit.
2. The battery powered transmitter
3. Insert the batteries in display unit and power up.
4. Connect the current sensor clamp to input electrical wire.



1. Advise how you configured and tested the Current Cost EnviR Energy Monitor

ANSWER:

* Connect the clamp to the live wire and connect transmitter unit.
* Turn on the transmitter unit.
* Connect the transmitter unit to PC to download the data.
* Analyse the result with the computer to generate the report.

1. Advise how you could document the installation and energy audit

(see <http://my.currentcost.com/>)

ANSWER: Record the electrical power consumption while doing the test conditions as below.

* PC
* Server
* WebClient
* ThinClient
* Practicum
* **Identify power consumption of a computer system under different operating conditions using the Current Cost EnviR Energy Monitor and appropriate power lead or similar energy meter.**
* **Recommendations on upgrading computer system.**

1. Record power consumption and notes e.g. range, variability, operating conditions:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Condition** | **Power consumption**  **(watts)** | | | | **Notes** |
|  | **PC** | ThinClient  Y100 | WebClient | Server Blackbox |  |
| **OFF** | 17 | 0.3 | 0.27 | 19 |  |
| **MAX BOOT** | 51 | 3.5 | 5.1 | 42 |  |
| **IDLE** | 42 | 3.2 | 3.4 | 42 |  |
| **Wordprocessing** | 36 | 3.3 | 5.1 | 44 |  |
| **Spreadsheets** | 36 | 3.3 | 5.1 | 44 |  |
| **Web browsing**  <http://news.bbc.co.uk/2/hi/programmes/click_online/default.stm> | 45 | N/A | 4.6 | N/A |  |
| **Low level music**  <http://grooveshark.com/#/s/Fall+At+Your+Feet/3KIZB0?src=5> | 44 | N/A | 6.7 | N/A |  |
| **Low level video**  <http://www.joost.com/39w1yk49/#/?video_info=33p1yw1t> | 57 | N/A | 5.2 | N/A |  |

1. Evaluate the extent to which sustainability could be integrated into an upgrade of the computer system. Advise your recommendations:

**Migrant server virtualization instead using the physical server**

Virtualization is the perfect solution for applications that are meant for small- to medium-scale usage. Virtualization should not be used for high-performance applications where one or more servers need to be clustered together to meet performance requirements of a single application because the added overhead and complexity would only reduce performance. We're essentially taking a 12 GHz server (four cores times three GHz) and chopping it up into 16 750 MHz servers. But if eight of those servers are in off-peak or idle mode, the remaining eight servers will have nearly 1.5 GHz available to them.

While some in the virtualization industry like to tout high CPU utilization numbers as an indication of optimum hardware usage, this advice should not be taken to the extreme where application responsiveness gets excessive. A simple rule of thumb is to never let a server exceed 50% CPU utilization during peak loads; and more importantly, never let the application response times exceed a reasonable SLA (Service Level Agreement). Most modern servers being used for in-house server duties are utilized from 1 to 5% CPU. Running eight operating systems on a single physical server would elevate the peak CPU utilization to around 50%, but it would average much lower since the peaks and valleys of the virtual operating systems will tend to cancel each other out more or less.

While CPU overhead in most of the virtualization solutions available today are minimal, I/O (Input/Output) overhead for storage and networking throughput is another story. For servers with extremely high storage or hardware I/O requirements, it would be wise to run them on bare metal even if their CPU requirements can be met inside a Virtual environment. Both XenSource and Virtual Iron (which will soon be Xen Hypervisor based) promise to minimize I/O overhead, yet they're both in beta at this point, so there haven't been any major independent benchmarks to verify this.

**Migrant desktop workstation to Thin Client or Zero Client or We Client**

In a thin client environment, workers do their computing on a virtual desktop residing on the central server. Users access the environment through a thin client—a simple computing device that contains no hard drives or other moving parts and relies on the server for all computing resources.

**Why a Business Should Consider a Thin Client Solution**

Thin clients are the ideal solution for today's healthcare, government, industrial, retail, financial, and education industries if the operation is facing such issues as:

• Desktop replacement costs

• Network security

• Data access to mobile or remote workers

• Supporting application hardware on diverse hardware

• Ensuring data is accessible and secure

**Enhanced security**

Thin clients have no hard drive, allowing for more secure storage of data and applications on the server. In fact, keystrokes, mouse activity, and screen images are all that is sent between the client and the server. They are easy to replace if lost, stolen, or damaged. Thin clients are the ideal choice for businesses that face regulatory compliance laws such as HIPAA or Sarbanes-Oxley.

**Streamlined Manageability**

Thin clients are managed at the server located within the data center. The client hardware has fewer points of failure and is less susceptible to viruses and malware. The clients connect to servers via web browsers or remote desktop software. Depending on user needs, client desktops can be simple single-application kiosks or a flexible and familiar Windows environment.

Thin clients are fast and easy to deploy—they can be out of the box and set up in less than ten minutes. Plus, they can be remotely configured and managed. Software updates, virus scanning, and patches can be executed on the server

**Reliability**

In the event of a natural disaster or emergency, thin clients provide business continuity. And with no hard drive, fan, or other moving parts, thin clients have a much longer lifespan than standard computers and can be cost-effectively replaced. Thin clients are ideal for dusty, remote, or space-constrained environments.

**Energy Efficiency**

Thin clients offer significant savings in power usage over traditional desktops. This is realized not only in lower energy costs but in reduced cooling costs by the elimination of heat generating PCs in some cases.

**Lower Total Cost of Ownership**

Increased security, reliability, easy management, and longer useful lifespan—all thin client business benefits that combine to deliver a lower cost of ownership. In fact, a Gartner study measured thin client TCO annual savings as high as:

* + 79% downtime cost-per-user
  + 16% capital cost-savings
  + 34% less in maintenance
  + 19% less to operate
  + 48% overall lower TCO

**Smart Zero Client Technology**

HP Smart Zero Technology gives you a simple, reprogrammable and affordable solution. It supports multiple protocols and can be reprogrammed on the fly, delivering a no-compromise, intelligent zero client experience for remote and cloud computing environments. HP Smart Zero Clients allow end users to be up and running in seconds with no configuration or management required on the device side. Just set up your server, boot the client and connect. HP Smart Zero Technology combines the benefits of a zero client with HP auto-sensing technology that automatically connects to the network and searches for the right Citrix, VMware or Microsoft client virtualization infrastructure and downloads everything it needs to deliver a robust user experience. The user is up and running quickly with no local user interface and just three steps from log on to productivity. HP Smart Zero Clients can also be managed by HP Device Manager for enhanced visibility of devices or mixed device environments.